

A RESOLUTION OF THE NOMENCLATURAL CONFUSION SURROUNDING
PLAGIOLA RAFINESQUE, *EPIOBLASMA* RAFINESQUE, AND *DYSNOMIA* AGASSIZ
 (MOLLUSCA: BIVALVIA: UNIONIDAE)

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ABSTRACT

The unionid genus *Plagiola* Rafinesque 1819 has been used with an erroneous type species concept. The lectotype subsequently designated for the original type species, *interruptus* Rafinesque 1820, is based on a replaced specimen. The correct type species concept for *Plagiola interruptus* Rafinesque 1820 is established herein as *Ptychobranthus fasciolaris* (Rafinesque 1820). *Plagiola* Rafinesque 1819 is thus a senior synonym of *Ptychobranthus* Simpson 1900 by simple priority. A syntype of *Epioblasma biloba* is identified as a very large female *Epioblasma torulosa rangiana* (Lea 1838). Thus, by simple priority, *Dysnomia* Agassiz 1852 is a junior synonym of *Epioblasma* Rafinesque 1831. The species group listed by Johnson (1978) in *Plagiola* is moved to *Epioblasma*. The northern riffleshell, *Epioblasma torulosa rangiana* (Lea 1838) becomes *Epioblasma torulosa biloba* Rafinesque 1820 by simple priority. The problems with the incorrect lectotype of *Plagiola*, the proposed suppression of the generic and specific names *Plagiola interrupta*, and the rediscovered syntype and neotype of *Epioblasma* are to be referred to the International Commission on Zoological Nomenclature.

Key words: Nomenclature, *Plagiola*, *Epioblasma*, *Dysnomia*, Bivalvia, Unionidae.

INTRODUCTION

The mere mention of the name Rafinesque will elicit a strong opinion from most botanists and zoologists. Rafinesque (1818a,b; 1819; 1820; 1831; 1832) described numerous new unionid bivalves, primarily from the Ohio River and its tributaries in Kentucky and Ohio. Some of the confusion surrounding the recognition of his taxa stems from the perceived lack of identified specimens in major museums, poor published illustrations, purportedly poor descriptions, and some confusion over the reprinting and translation of his obscure papers (see Bogan, 1988). Probably the most confused case is that surrounding the use of the generic name *Plagiola* Rafinesque 1819 and its type species. The two major questions are, first, what is the correct type species of *Plagiola*; and second, what is the correct identification of the specimens contained in the type series?

THE PROBLEM (PART I)

Rafinesque (1819: 246) described the subgenus *Unio* (*Plagiola*) and included six nude species names: *verrucosa* Rafinesque 1819; *fasciolaris* Rafinesque 1819; *leptodon* Rafinesque 1819, *depressa* Rafinesque 1819, *flava* Rafinesque 1819 and *obliquatus* Rafinesque 1819.

Rafinesque (1820: 302-303) subsequently erected the subgenus *Obliquaria* (*Plagiola*) Rafinesque 1820 and included four validly described species: *decorticata* Rafinesque 1820, *interrupta* Rafinesque 1820, *depressa* Rafinesque 1820, *lineolata* Rafinesque 1820. Rafinesque did not designate any of the species as the type species of the subgenus.

Conrad (1834: 69) was the first author to next treat the taxa Rafinesque had included in the subgenus *Plagiola*. He listed *Unio brevidens* Lea 1831 in the synonymy of *Unio interruptus* Rafinesque 1820 (Conrad, 1834: 70) and listed *Unio depressa* Rafinesque 1820 and *Unio ellipsaria* Rafinesque 1820 as synonyms of *lineolatus* Rafinesque 1820 (Conrad, 1834:70). Conrad (1834), as first revisor, established the priority of *lineolata* Rafinesque 1820 over *depressa* Rafinesque 1820. Thus, the identification of *interruptus* Rafinesque with *Unio*

brevidens Lea can be traced back to Conrad (1834), who based his identification on the Rafinesque specimens in the Poulson Collection, but did not note that the specimen was female. Conrad (1838: 88, pl. 48) figured the Poulson specimen of *interruptus* Rafinesque and the figured specimen is clearly a female *Unio brevidens* Lea 1831.

Férussac (1835: 28) interpreted Rafinesque's (1820) identifications of three of the species included in *Obliquaria (Plagiola)* as: *interruptus* Rafinesque as a valid species with *brevidens* Lea as a synonym; *lineolatus* Rafinesque as a valid species, with *depressus* Rafinesque and *securis* Lea 1829 as synonyms.

Herrmannsen (1847: 279) designated the type species of *Plagiola* Rafinesque 1820 as *Unio interruptus* Rafinesque 1820 (Table 1).

TABLE 1. List of the genera, type species and current identification of the type species discussed.

Genus	Type species	Current identification of type species
<i>Plagiola</i> Rafinesque 1819	<i>Obliquaria (Plagiola) interrupta</i> Rafinesque, 1820 Type species by subsequent designation (Herrmannsen 1847). MNHN syntype specimen sent to Férussac by Rafinesque is currently identified as a specimen of <i>Ptychobranchnus fasciolaris</i> (Rafinesque 1820). Lectotype designated by Johnson and Baker (1973:159, pl. 7, fig. 4) [ANSP 20257] is a female specimen of <i>Unio brevidens</i> Lea, 1831. Type species of authors: <i>Obliquaria (Plagiola) lineolata</i> (Rafinesque 1820)	MNHN paralectotype is <i>Ptychobranchnus fasciolaris</i> ANSP lectotype is <i>Epioblasma brevidens</i>
<i>Epioblasma</i> Rafinesque 1831	<i>Epioblasma biloba</i> Rafinesque 1831 Type species by original monotypy	MNHN syntype is <i>Epioblasma torulosa biloba</i> Rafinesque 1831
<i>Ptychobranchnus</i> Simpson 1900	<i>Unio phaseolus</i> Hildreth 1828 Type species by original designation	<i>Ptychobranchnus fasciolaris</i> (Rafinesque 1820)

Agassiz (1852: 48) included "*U. lineolata (Securis [sic] Lea) truncata-nervosa-*, etc.," but made no mention of *interruptus* Rafinesque, essentially redefining the scope of *Plagiola* by the species he included. He raised *Plagiola* to generic level. This is the point where confusion begins.

F.C. Baker (1898: 90-93) used *Plagiola* in the sense of Agassiz and included *Unio donaciformis* Lea 1828 and *Unio truncatus* (Rafinesque 1820) in *Plagiola*. Simpson (1900b: 603; 1914: 302) followed Agassiz and Baker and included two subgenera within *Plagiola* to incorporate both *securis* and *truncatus*. Ortmann (1912; 1919) subsequently used *Plagiola* with the type species *Unio securis* Lea 1829. Simpson (1900b; 1914) in both of his compendia overlooked the species *interruptus* Rafinesque 1820.

Vanatta (1915: 550) identified the Rafinesque specimen in the Academy of Natural Sciences of Philadelphia collection from the Poulson Collection as *Truncilla brevidens* (Lea 1834), but felt *Unio (Plagiola) interruptus* Rafinesque was preoccupied by *Unio solenoides interruptus* Rafinesque 1820. Walker (1916: 45) observed under *Truncilla brevidens* Lea that *Unio (Plagiola) interruptus* was not preoccupied, and if identifiable, would have priority.

Ortmann & Walker (1922: 66-68) recognized that *Unio (Plagiola) interruptus* Rafinesque was not preoccupied, but could not equate the female specimen of *Unio brevidens* Lea 1834 (which is Vanatta's correct identification of the Poulson specimen) with Rafinesque's original description. They observed that if the description is of *brevidens* it had to be of a male

shell. Ortmann & Walker (1922: 67-68) questioned the distribution listed by Rafinesque for *interruptus* as Kentucky and Ohio rivers and decided *interruptus* Rafinesque was unidentifiable. *Unio brevidens* Lea 1834 is not known historically outside of the Tennessee-Cumberland River drainages (Bogan & Parmalee, 1983: 27).

Frierson (1927: 79) used *Plagiola* with the type species as *lineolata* Rafinesque 1820. He noted that "Rafinesque's *Unio interruptus*, when identified at all, has usually been called the same as '*Unio brevidens*' – but his description exactly agrees with the species afterwards given the identical name by Lea" (Frierson, 1927: 79). *Unio interruptus* Lea 1836 is a synonym of *Lampsilis menkiana* [= *Villosa taeniata* (Conrad 1834)]. Again it should be noted that *Villosa taeniata* is restricted to the Tennessee and Cumberland rivers in Tennessee and does not occur in the Ohio River.

F.C. Baker (1928: 231) used *Plagiola* (Rafinesque 1819) *sensu* Agassiz with the type species as *Unio securis* Lea, considering *Plagiola* as a monotypic genus.

Thiele (1934: 834) discussed the confusion of the type species of *Plagiola* as he understood the problem. He erected *Plagiolopsis* Thiele 1934, and designated *P. securis* (Lea 1829) as the type species by original monotypy. Thiele (1934: 834) misread Frierson (1927: 79), who listed *Unio interruptus* Rafinesque 1831 and Lea 1836 as a synonym of *Lampsilis menkiana* (Lea 1836) [= *Villosa taeniata* (Conrad 1834)]. Thiele noted that *Unio interruptus* was identical to *Unio brevidens* Lea and followed Frierson (1927) listing *Plagiola* as a synonym of *Lampsilis* Rafinesque 1820.

H.B. Baker (1964: 141) commented on the initial improper use of *Unio securis* as the type species of *Plagiola* *vide* Agassiz (1852). He noted the prior type designation by Herrmannsen (1847) and rejected Ortmann & Walker's (1922) use of a subsequent type species designation. Baker argued that "since *Obliquaria interrupta* Raf., 1820: 302, is not identifiable, *Plagiola* Raf. (1819) also must be a '*nomen dubium*' unless the I.C.Z.N. set aside Herrmannsen's type selection, and validate *Plagiola*, as generally used."

J.P.E. Morrison (1969: 24) considered *brevidens* Lea to be a synonym of *interruptus* Rafinesque 1820, but gave no clarification or discussion of this decision. Haas (1969a: 408; 1969b: 455), Parmalee (1967: 80-81) and La Rocque (1967: 249) all used *Plagiola* Rafinesque 1819 with the type species designation of *Unio securis* Lea 1829 following Agassiz (1852). Clarke (1973: 35) followed the conventional use of *Plagiola* and added that *Crenodonta Schlüter* 1838, with a type species of *Unio securis* by subsequent designation by Herrmannsen (1852: 38), was a junior synonym of *Plagiola*.

Johnson & Baker (1973: 159, pl. 7, fig. 4) figured the Rafinesque-Poulson specimen of *Obliquaria (Plagiola) interrupta* (ANSP 20257), designating this specimen as the lectotype. They noted a paralectotype in the Museum National d'Histoire Naturelle, Paris, but made no comment about the identity of the specimen. They reported the discrepancy between the original type locality of Kentucky and Ohio rivers and the known historic distribution of *Unio brevidens* Lea and restricted the type locality to the Cumberland River. Johnson (1973: 36) noted the Rafinesque types located by Chevalier in the Paris collection and listed the paralectotype of *interruptus* Rafinesque, but once again did not confirm the identity of the species of the paralectotype specimen or figure the specimen.

Johnson (1978), using the lectotype designation of *Obliquaria (Plagiola) interruptus* Rafinesque in Johnson & Baker (1973), based a monograph of the species group that had been previously placed in *Truncilla* Rafinesque 1820 (Walker, 1910) and *Dysnomia* Agassiz 1852.

THE RESOLUTION (PART I)

The paralectotype of *Obliquaria (Plagiola) interrupta* Rafinesque 1820 in the Museum National d'Histoire Naturelle (MNHN), Paris, is a good specimen of *Ptychobranchus fasciolaris* (Rafinesque 1820). This specimen is figured here for the first time (Fig. 1). This is not the

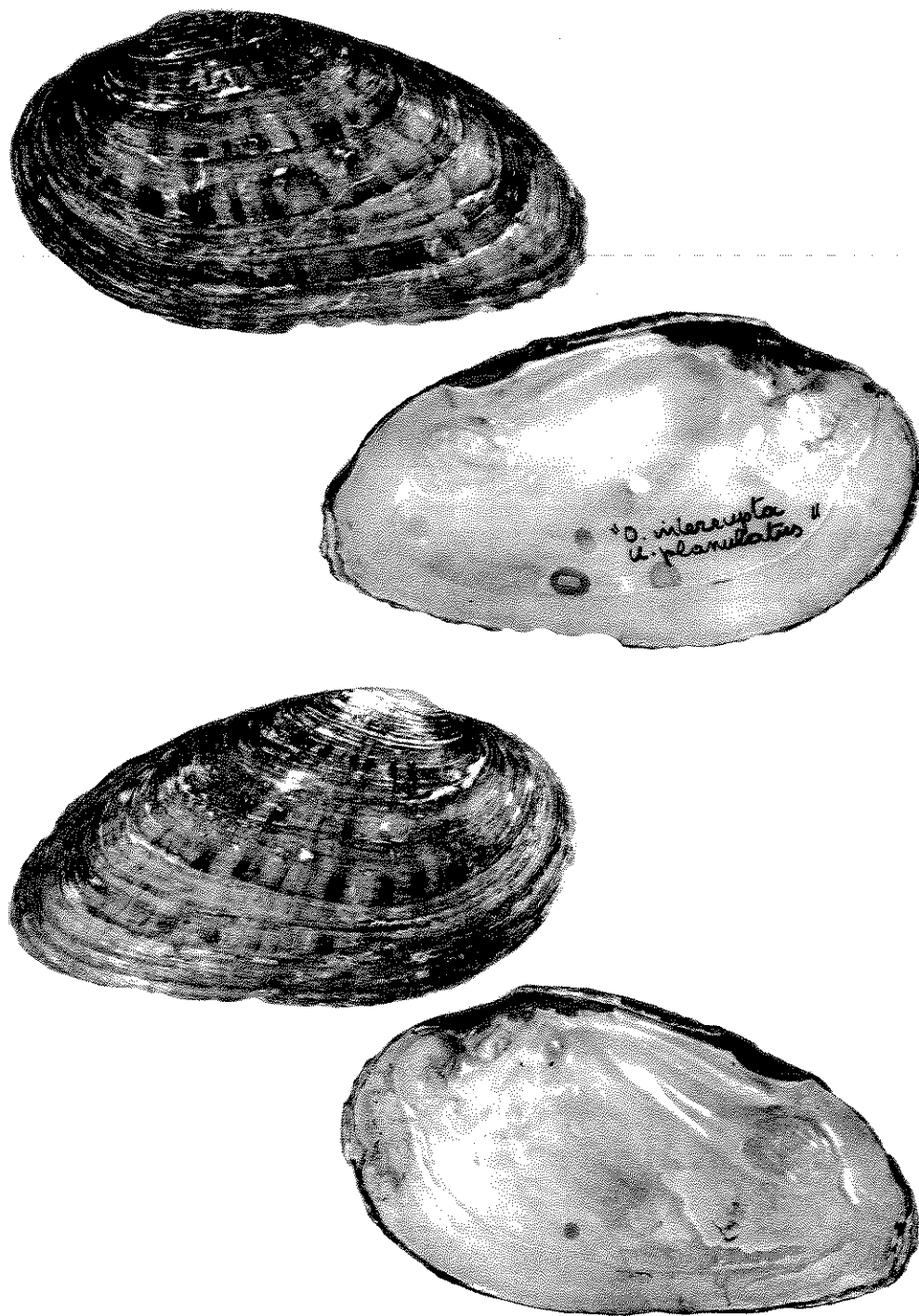


FIG. 1. Paralectotype of *Obliquaria (Plagiola) interrupta* Rafinesque 1820 in the Malacology Collections, Museum National d'Histoire Naturelle, Paris, France.

same species as the designated lectotype (*Unio brevidens* Lea). This confusion is compounded by the fact that the lectotype is a female specimen with a well developed marsupial swelling which is not mentioned in the original description.

Another piece of the puzzle not heretofore considered is found in an unpublished field notebook of Rafinesque from 1818. This field notebook is currently housed in the Archive Collections of the Chester County Historical Society, West Chester, Pennsylvania. This notebook contains an unpublished illustration and description of *interruptus* Rafinesque (Fig. 2). The figured specimen is clearly identifiable as *Ptychobranthus fasciolaris* (Rafinesque 1820) (Table 1).

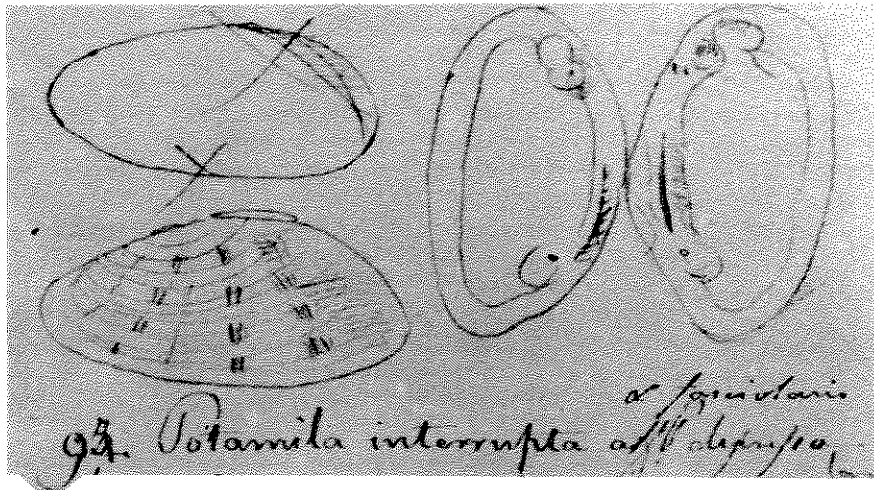


FIG. 2. Figure from an unpublished field notebook of Rafinesque from 1818. This field notebook is currently housed in the Archive Collections of the Chester County Historical Society, West Chester, Pennsylvania (Archive Number 1894).

Now with all of these facts in hand regarding the identity of *Obliquaria* (*Plagiola*) *interrupta* Rafinesque 1820: 1, the species description; 2, the specimen sent to Férussac, now in the Museum National d'Histoire Naturelle, Paris (Fig. 1); 3, the drawing in the unpublished Rafinesque notebook (Fig. 2), and 4, the original type locality, the species *interruptus* Rafinesque 1820 is clearly the species currently known as *Ptychobranthus fasciolaris* (Rafinesque 1820) and not *Unio brevidens* Lea. The Rafinesque-Poulson specimen in the Academy of Natural Sciences of Philadelphia, subsequently incorrectly designated as the lectotype by Johnson & Baker (1973), was actually a substituted specimen, being a specimen erroneously labeled by Rafinesque or a lot with labels mixed before the collection was sold to Poulson.

Plagiola Rafinesque 1819, with the type species *Obliquaria* (*Plagiola*) *interrupta* Rafinesque 1820 using the correct type species concept, is a senior synonym of *Ptychobranthus* Simpson 1900, type species by original designation *Unio phaseolus* Hildreth, 1828 (Simpson, 1900a: 79) [= *P. fasciolaris* (Rafinesque 1820)]. This creates a problem and confusion by replacing a very well established genus, *Ptychobranthus*, with another recognized but confused generic name *Plagiola*. The ICZN has to be petitioned to suppress the lectotype designation of Johnson & Baker (1973) and select the MNHN syntype as the correct lectotype for *Plagiola*. In light of the numerous placements of *Plagiola* in the last 100 years (five different species groups) and the confusion which would result from replacing the well established and recognized genus *Ptychobranthus* with *Plagiola*, the genus *Plagiola* Rafinesque 1819 and its type species *interrupta* Rafinesque 1820 should be suppressed.

The species *Obliquaria (Plagiola) lineolata* Rafinesque 1820 and its synonyms, which were historically placed in *Plagiola* (Rafinesque, 1819) *fide* Agassiz (1852), belong in the genus *Ellipsaria* Rafinesque 1820 as clearly diagnosed by H.B. Baker (1964). *Plagiolopsis* Thiele 1934, with *Unio securis* Lea 1829 as the type species, is a junior synonym of *Ellipsaria* Rafinesque 1820.

THE PROBLEM (PART II)

The species group including *Unio brevidens* Lea and *Unio torulosa* Rafinesque 1820 would now be without generic placement because of the movement of the generic name *Plagiola* to supersede *Ptychobranthus*. This species group historically was placed in *Dysnomia* Agassiz 1852 (type species *Unio foliatus* Hildreth 1828). Agassiz (1852: 44) incorrectly placed the group of *Truncilla triqueter* Rafinesque 1820 and *Unio arcaeformis* Lea 1831 in the genus *Truncilla* Rafinesque 1819, and was followed by Simpson (1900b; 1914). Most recently this group of species has been placed in the genus *Epioblasma* Rafinesque 1831 (see Valentine & Stansbery, 1971; Stansbery, 1973: 22; 1976: 49; Turgeon *et al.*, 1988). However, here again a mass of confusion is encountered.

Rafinesque (1831: 2) erected the genus *Epioblasma* and included only *Epioblasma biloba* Rafinesque 1831. Therefore, *Epioblasma biloba* is the type species of *Epioblasma* by original monotypy. The type locality for *Epioblasma biloba* is the Green and Kentucky rivers (Table 1).

Rafinesque sent a specimen to Férussac, who was not certain if *Epioblasma biloba* was a synonym of *Amblema gibbosa* Rafinesque 1820 [= *torulosa* Rafinesque 1820] (Férussac 1835: 27, 34). Lea (1836; 1838; 1852; 1870) and Simpson (1900b; 1914) considered *Epioblasma biloba* to be a *nomen dubium*.

Frierson (1914: 7) stated that *Epioblasma biloba* Rafinesque was identifiable as *Unio foliatus* Hildreth 1828 [= *flexuosa* Rafinesque 1820] and that *Epioblasma* Rafinesque 1831 was a senior synonym of *Dysnomia* Agassiz 1852.

Ortmann & Walker (1922: 70) listed *Epioblasma biloba* Rafinesque 1831 as a synonym of *Unio flexuosa* Rafinesque 1820 (+ *Unio foliatus* Hildreth 1828) and presented an argument why the genus and species were unrecognizable.

Frierson (1927: 101) listed *Epioblasma biloba* in the index under *Dysnomia torulosa* (Rafinesque 1820), but failed to include it in the text or to mention *Epioblasma*. This is directly contrary to his comments in his earlier paper (Frierson, 1914).

Haas (1969a: 478) included *Epioblasma biloba* in the synonymy of *Dysnomia flexuosa*. But, after including *Epioblasma biloba* in the synonymy of *Dysnomia flexuosa*, he failed to recognize the priority of *Epioblasma* over *Dysnomia*.

Johnson (1973) did not mention any specimen of *Epioblasma biloba* in the MNHN collection. Johnson & Baker (1973: 149) reported that the Rafinesque specimen in the Férussac collection was not found and presumed lost. In his monograph of the genus *Plagiola* [Johnson (1978: 283, pl. 15, fig. 7)], Johnson selected ANSP 56571 [*Dysnomia flexuosa*, female] as the neotype and restricted the type locality to the Ohio River near Cincinnati, Hamilton Co., Ohio.

THE RESOLUTION (PART II)

The Rafinesque syntype of *Epioblasma biloba* Rafinesque 1831 reported to be in the Férussac Collection, was found in the MNHN collections in 1984. It is figured here for the first time (Fig. 3). The pair of valves was labeled by Férussac, who wrote the Rafinesque species name in the shell and that Rafinesque had sent the specimen. This syntype is a female specimen of *Epioblasma torulosa rangiana* (Lea 1838).

Epioblasma Rafinesque 1831 (type species *biloba* Rafinesque 1831 by original monotypy) has priority over *Dysnomia* Agassiz 1852. *Epioblasma* had priority over *Dysnomia* when

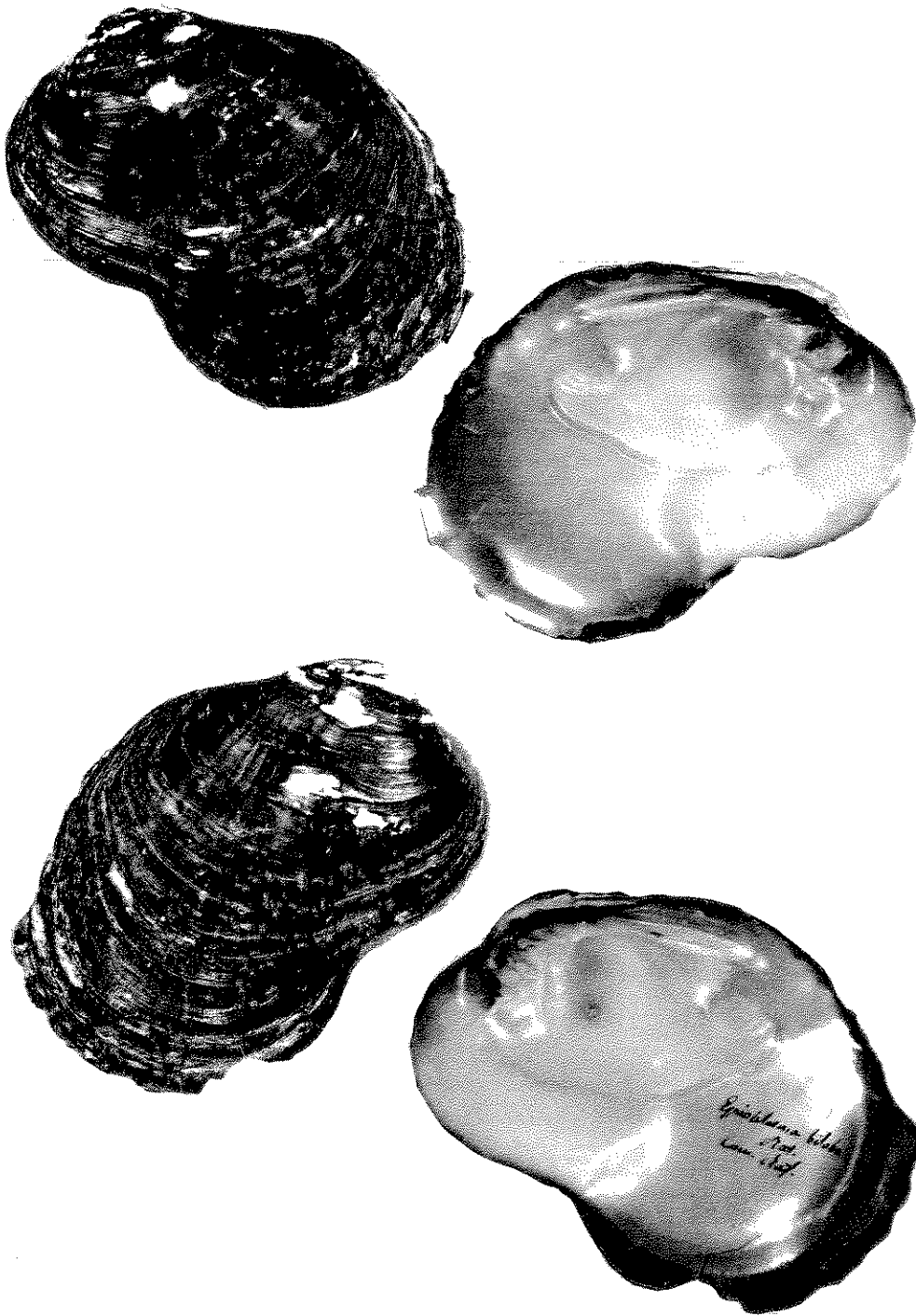


FIG. 3. Syntype of *Epioblasma biloba* Rafinesque 1831 in the Férussac Collection in the Malacology Collections, Museum National d'Histoire Naturelle, Paris, France.

the neotype was designated, but according to Johnson (1978) would have been a junior synonym of his use of *Plagiola*. Since *Plagiola* Rafinesque has been shown to be a senior synonym of *Ptychobranchus* Simpson 1900 (as discussed above) the species group formerly placed in *Dysnomia* Agassiz 1852 and more recently by Johnson (1978) in *Plagiola*, belongs in the genus *Epioblasma*. *Unio rangiana* Lea 1838 is a junior synonym of *Epioblasma biloba* Rafinesque 1820. Thus, the Federally endangered taxon, the northern riffleshell, should be *Epioblasma torulosa biloba* Rafinesque 1820.

The subsequent discovery of an original syntype of *Epioblasma biloba* after the designation of a neotype must be referred to the International Commission of Zoological Nomenclature for resolution.

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